Claims

1. Device (100) for the temporal expansion or compression of a sequence of samples,
with an input memory (104), in which samples to be processed are stored,
with a control unit (20), which controls a temporal expansion or compression of the sequence of samples in a cyclic manner based on a conversion factor (N), in which case a working cycle (M) contains a predetermined number of working steps (s) for processing a sub-sequence of the sequence of samples,
with a skew unit (106), which is linked on the input side to the output of the input memory and that referred to the sample processed in one working step (s) of the sequence, determines a sample by an offset number (N) that follows or precedes in the sequence by an offset number and with a merge unit (16, 112), which during a working cycle (M) on the one hand, merges the original sequence of samples or a filtered sequence of samples that have been generated from the original sequence of samples by means of a filter unit (14) and, on the other hand, with a time-staggered sequence that has been generated with the aid of the skew unit (106) and subsequently filtered or a filtered time-staggered sequence generated from the time-staggered sequence by means of the filter unit (14).

2. Device (100) according to claim 1, characterized by a filter unit connected downstream of the merge unit (16, 112), in which case in particular at the merge unit, two unfiltered sequences are merged and in which case in particular the filter unit connected downstream is a time-variant attenuator.

3. Device (100) according to claim 1 or 2, characterized by a basic default unit, which for each working step (s) specifies a basic value in accordance with a basic function (C1a), an additional default unit, which for each working step

(s) specifies an auxiliary value in accordance with an auxiliary function (C2a),
a basic multiplication unit (108) contained in the filter unit (14), said multiplication unit linked on the input side to the output of the basic default unit and the output of the input memory (104) and which for each working step (s) calculates a product from the values present at the input side, an auxiliary multiplication unit (110) contained in the filter unit (14), which is linked on the input side to the output of the auxiliary default unit and the output of the skew unit (106) and which for each working step (s) calculates a product from the values present at the input side, and by an addition unit (112) contained in the merge unit (16), said addition unit linked on the input side to the outputs of the multiplication units (108, 110) and which for each working step (s) calculates the sum of the products present at the input side.

4. Device (100) according to one of the preceding claims 3, characterized in that the processed sub-sequences contain all the samples of the sample sequence or more than fifty eight percent of all the samples, in which case a sub-sequence preferably contains a signal, which is longer than 150 milliseconds or than 200 milliseconds.

5. Device (100) according to claim 4, characterized in that the basic function (C1a) and the auxiliary function (C2a) are constant in the center of a working cycle (M), and/or that preferably the basic function (C1a) and the auxiliary function (C2a) are constant at the start or of a working cycle (M),

and/or that preferably in the case of working steps (s) with an unchanged basic function (C1a) and with an unchanged auxiliary function (C2a), unnecessary units of the device are not operated.

6. Device (100) in accordance with one of the claims 1 to 3, characterized in that the processed sub-sequences contain less than half of all the samples of a sample sequence, and that the other samples are operated in another way, preferably in a less costly way, in particular by simply taking them over from the sequence of samples.

7. Device (100) according to one of the claims 3 to 6, characterized by an additional auxiliary default unit, which for each working step (s) specifies an additional auxiliary value in accordance with an additional auxiliary function (C3b, C2d),
an auxiliary processing unit (207, 320), which carries out a predetermined processing operation, an additional auxiliary multiplication unit (211, 311), which is linked on the input side to the output of the additional auxiliary default unit and the output of the auxiliary processing unit (207, 320) and for each working step (s) a product is calculated from the values present at the input side, in which case the addition unit (312) is also linked on the input side to the output of the additional auxiliary multiplication unit (211, 311) and for each working step (s) calculates the sum of the products present at the input side.

8. Device (100) according to claim 7, characterized in that the auxiliary processing unit (207) is linked on the input side to the output of the input memory and referred to a sample processed in a working step (s) determines a sample that follows or precedes by double the offset number (2N) in the sequence of the samples and that preferably the following applies to the basic function (C1b) and an auxiliary function (C2c):
Basic function (C1b) * basic function (C1b) + auxiliary function (C2c) * auxiliary function (C2c) = 1, in which case

preferably the following applies referring to an additional auxiliary function (C3c):
Auxiliary function (C2b) = auxiliary function (C2b) - additional auxiliary function (C3c) * basic function (C1b), and additional auxiliary function (C3b) = - auxiliary function (C2c) * additional auxiliary function (C3c),
and in which case preferably the additional auxiliary function (C3c) has a maximum at the intersection of the basic function (C1b) and the auxiliary function (C2c).

9. Device (100) according to claim 7, characterized in that the auxiliary processing unit (32) contains an all-pass, preferably an all-pass with the following transmission function:
$H = (z^{-N} + \gamma) / (1 + \gamma * z^{-N})$,
in which case H is the transmission function and γ determines a delay and γ in particular has the value 0.5 or a value greater than 0.5,
and in which case the following preferably applies:
Basic function (C1d) + auxiliary function (C2d) + additional auxiliary function (C3d) = 1.

10. Device (100) according to one of the preceding claims, characterized in that the units (106 to 112) contain electronic circuits without processors,
or that the device (100) contains at least one processor, which on processing the commands of a program, adduces the functions of at least one unit (106 to 112),
and/or that the sequence of samples contains at least one audio signal, in particular a voice signal and/or a music signal and/or a multifrequency in-band signal,
and/or that the device (100) is contained in a receiver unit or in a transmitter unit of a data transmission network,
and/or that the device (100) is contained in a reproducing

system, in particular in a music reproducing system, a dictating machine or a voice output unit,
and/or that the expansion or the compression is less than 20 percent or less than 10 percent.

11. Method for the temporal compression or expansion of a sequence of samples, in particular in a device (100) according to one of the preceding claims,
with the procedural steps carried out without restriction by the given sequence:
Specifying a working cycle (M), which contains a predetermined number of working steps (s),
specifying a sub-sequence of the sequence of samples for a working cycle (M),
which during a working cycle (M), generates a filtered or an unfiltered sub-sequence which is time-staggered to the sub-sequence of samples
which during a working cycle (M), on the one hand, merges (16, 112) the sub-sequence of samples or a filtered sub-sequence of samples that have been generated from the sub-sequence of samples and, on the other hand, the time-staggered filtered or unfiltered sub-sequence with a gradual transition of the samples of the one sequence to the samples of the other sequence.

12. Method according to claim 11, characterized by the following step:
Merging (16, 112) within at least one section of the working cycle (M),
in which case the section or the sections altogether contain less than one third of the working steps (s) or less than one seventh of the working steps (s) of a working cycle.

13. Method according to claim 11 or 12, characterized in that the merging (16, 112) is carried out without a preceding

analysis of the sequence of samples, in particular without the calculation of a cross correlation function.

14. Sequence of samples, characterized in that the sequence has been generated with a device according to one of the claims 1 to 10 or with a method according to one of the claims 11 to 13.